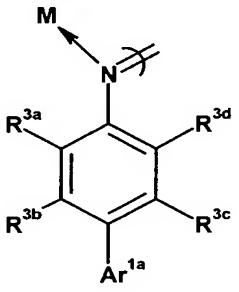
AMENDMENTS TO THE CLAIMS

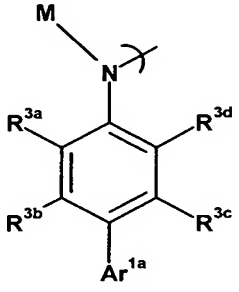
This listing of claims replaces all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS:

1. (original) A catalyst for olefin polymerization, comprising a Group 3-11 metal complex of a bidentate, tridentate, or tetradentate ligand, wherein said complex comprises at least one N-donor fragment of formula **1a** or **1b**;



1a



1b

wherein:

M is a Group 3-11 transition metal;

R^{3a-d} are each, independently, H, F, Cl, Br, hydrocarbyl, substituted hydrocarbyl, fluoroalkyl, nitro, heteroatom connected hydrocarbyl or heteroatom connected substituted hydrocarbyl; and

Ar^{1a} is an aryl or heteroaryl group substituted at one or both ortho positions by a group Q^2; wherein Q^2 is hydrocarbyl, substituted hydrocarbyl, heteroatom connected hydrocarbyl or heteroatom connected substituted hydrocarbyl.

2. (original) The catalyst according to Claim 1 wherein M is a Group 8-10 metal.

3. (original) The catalyst according to Claim 2, wherein M is nickel, and Q^2 is sufficiently long to extend sufficiently close to the metal M to increase the catalyst productivity at elevated temperatures, or in the presence of hydrogen, or both, relative to an otherwise similar catalyst wherein Q^2 is replaced by H, Me, or Ph.

4. (original) The catalyst according to Claim 2, wherein M is nickel, and Q^2 is sufficiently long to extend sufficiently close to the metal M to increase the regioselectivity or stereoselectivity of comonomer incorporation, relative to an otherwise similar catalyst wherein Q^2 is replaced by H, Me, or Ph.

5. (original) The catalyst according to Claim 2, wherein M is nickel, and Q^2 is sufficiently long to extend sufficiently close to the metal M to decrease the amount of chain-running, relative to an otherwise similar catalyst wherein Q^2 is replaced by H, Me, or Ph.

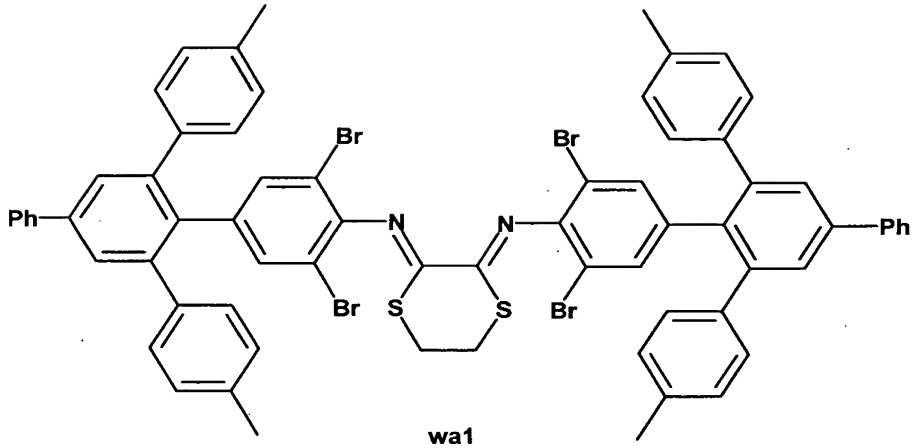
6. (original) The catalyst according to Claim 2, wherein M is palladium, and Q^2 is sufficiently long to extend sufficiently close to the metal M to decrease the amount of chain-running, relative to an otherwise similar catalyst wherein Q^2 is replaced by H, Me, or Ph.

7. (original) The catalyst according to Claim 2, wherein M is nickel, and Q^2 is sufficiently long to extend sufficiently close to the metal M to increase the chain-running stereoselectivity, relative to an otherwise similar catalyst wherein Q^2 is replaced by H, Me, or Ph.

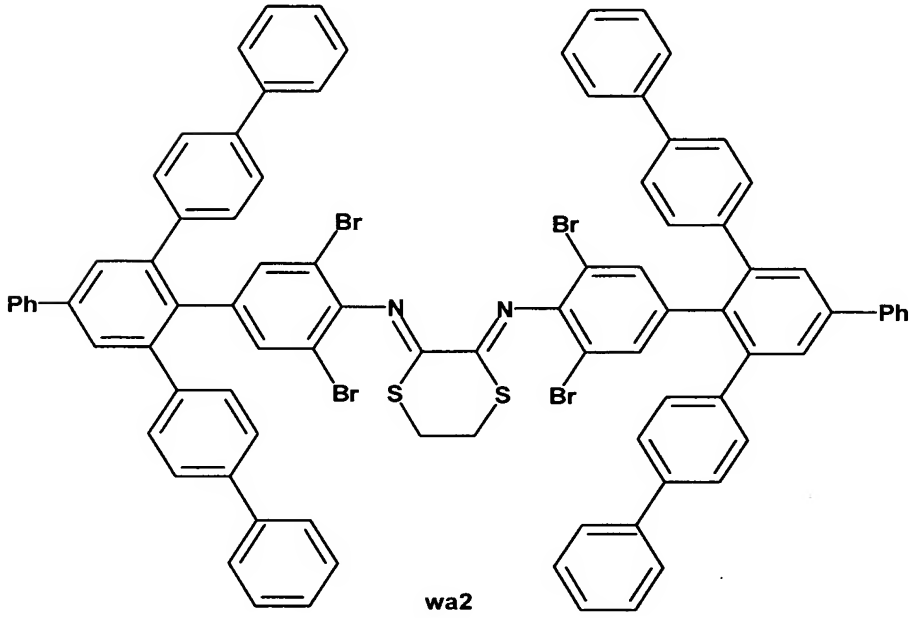
8. (original) The catalyst according to Claim 2, wherein M is nickel, and Q^2 is sufficiently long to extend sufficiently close to the metal M to decrease the rate of activation of the catalyst when an alkylaluminum reagent is used as cocatalyst, relative to an otherwise similar catalyst wherein Q^2 is replaced by H, Me, or Ph.

9. (original) The catalyst according to Claim 2 which comprises a bidentate ligand selected from **Set 1**;

Set 1

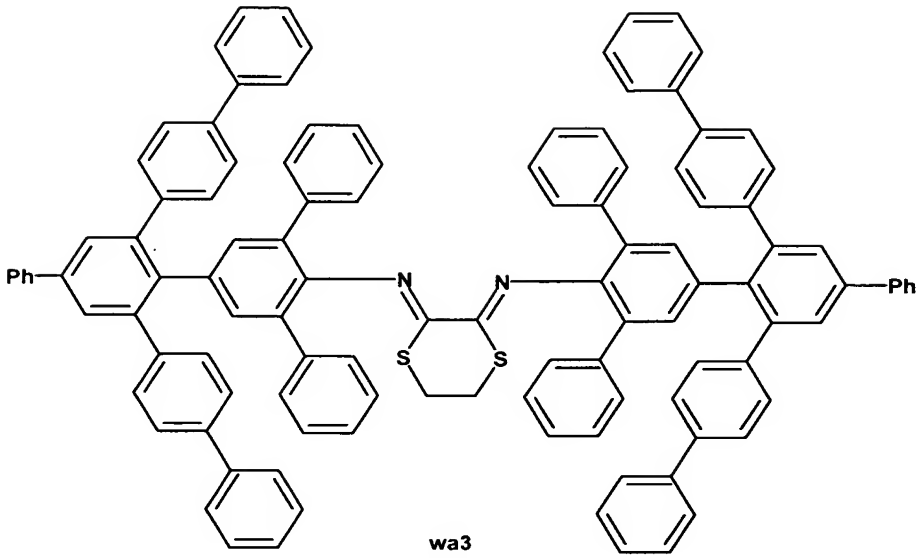


wa1

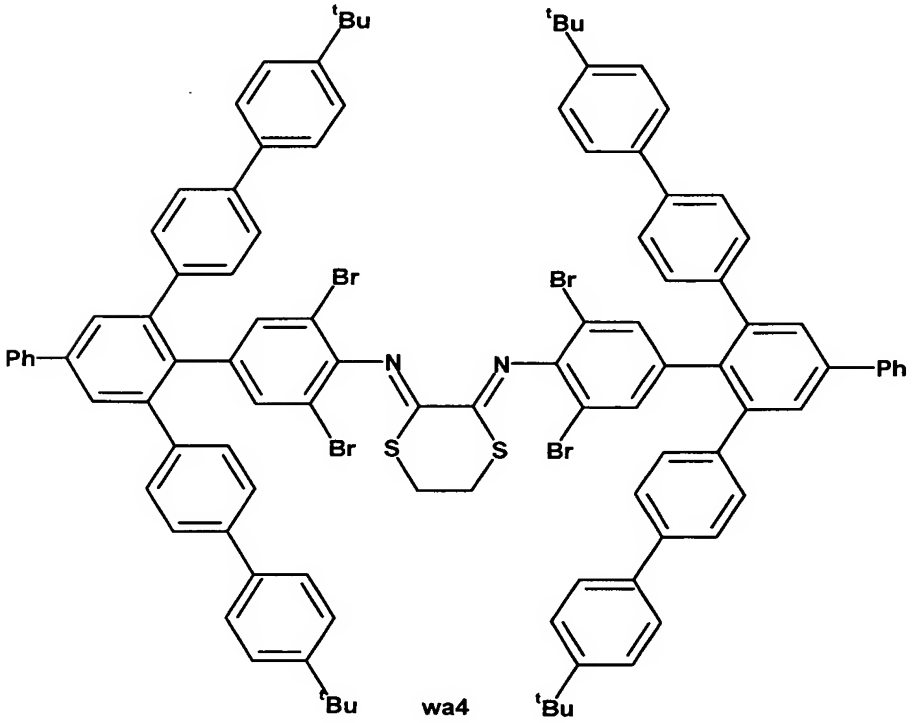


wa2

Set 1, cont'd

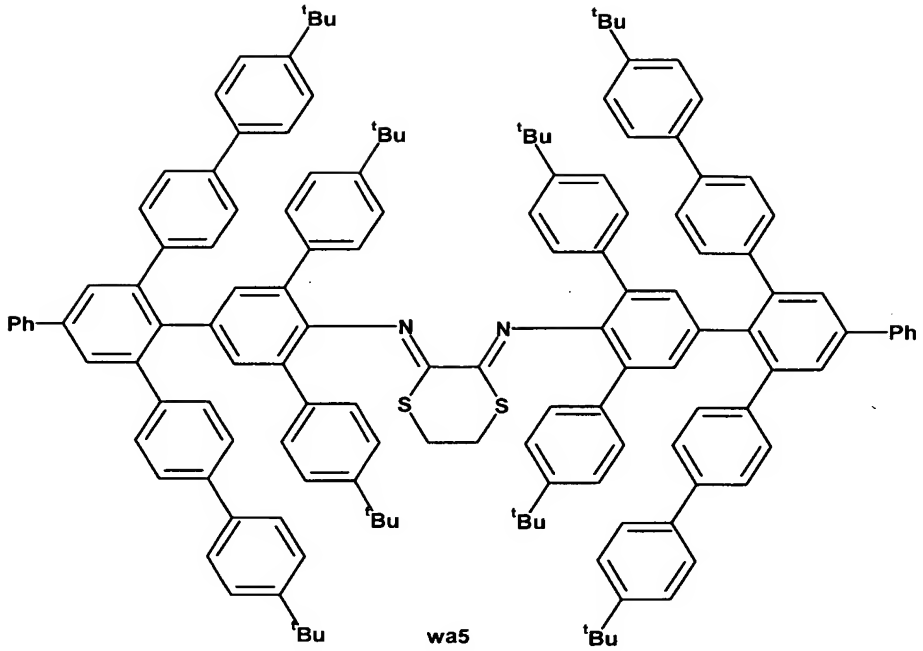


wa3

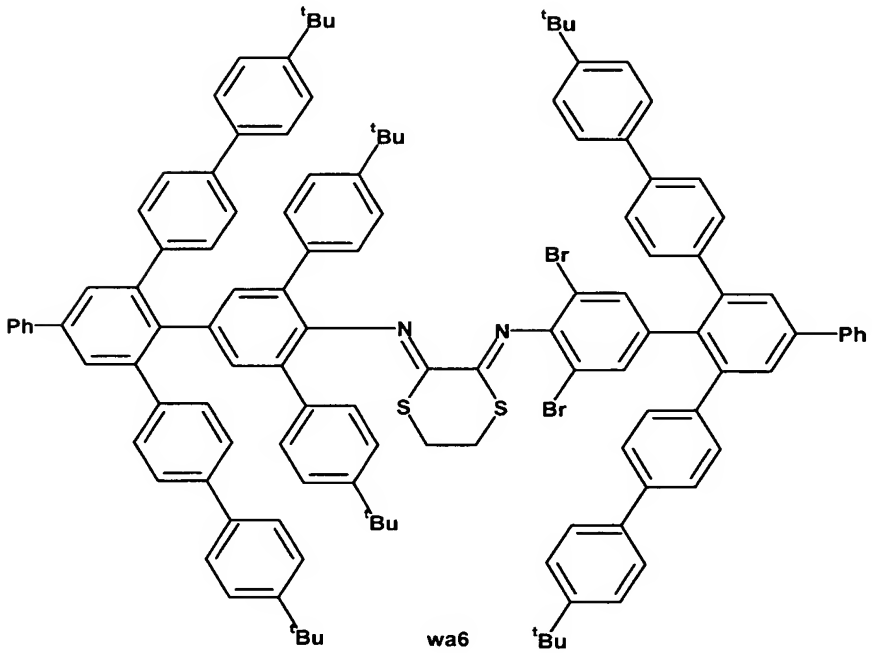


wa4

Set 1, cont'd

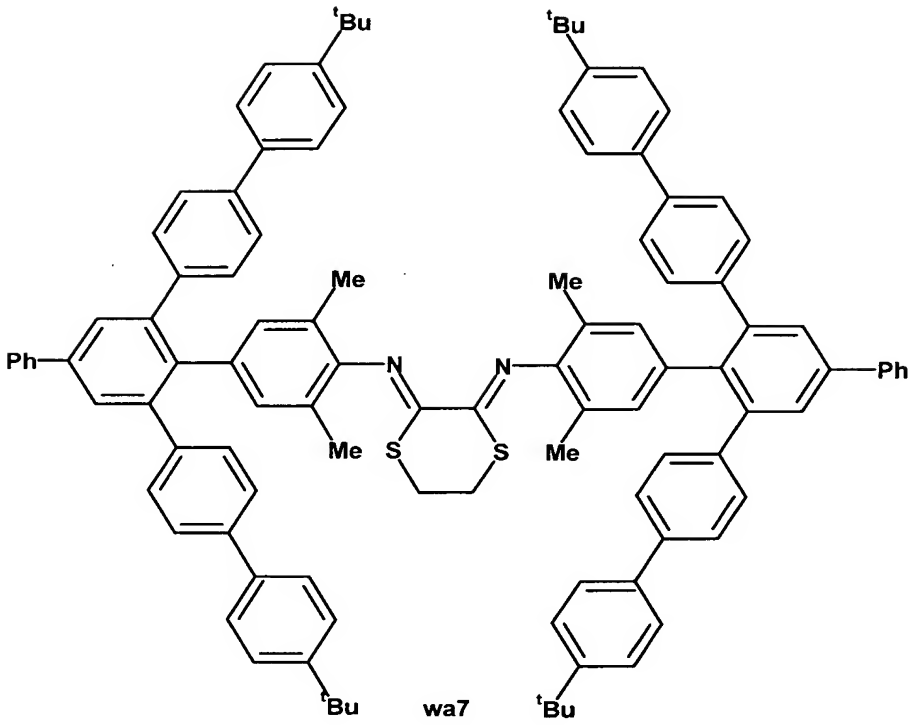


wa5

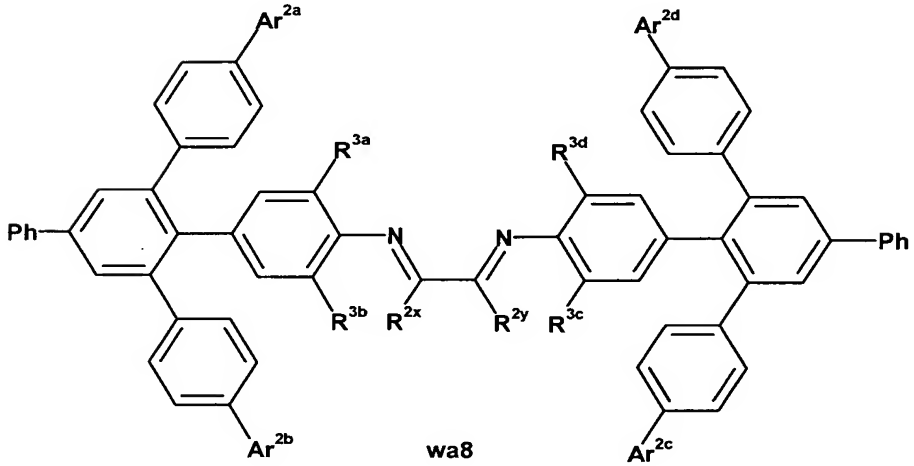


wa6

Set 1, cont'd

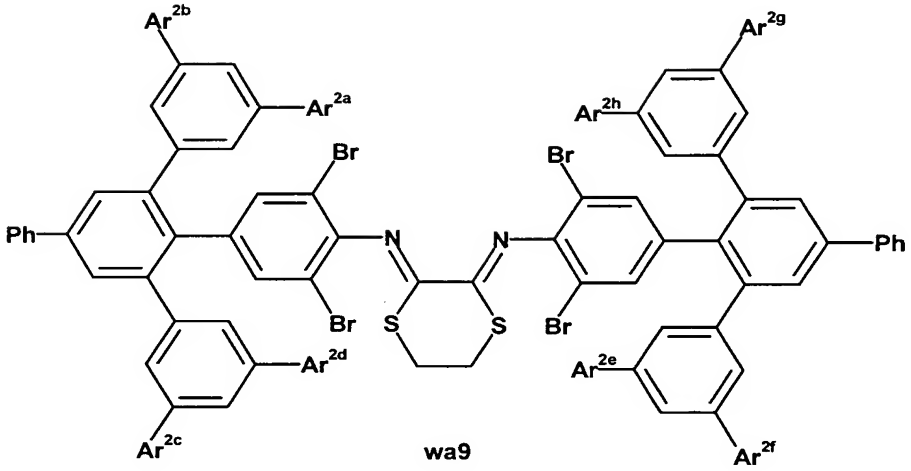


wa7

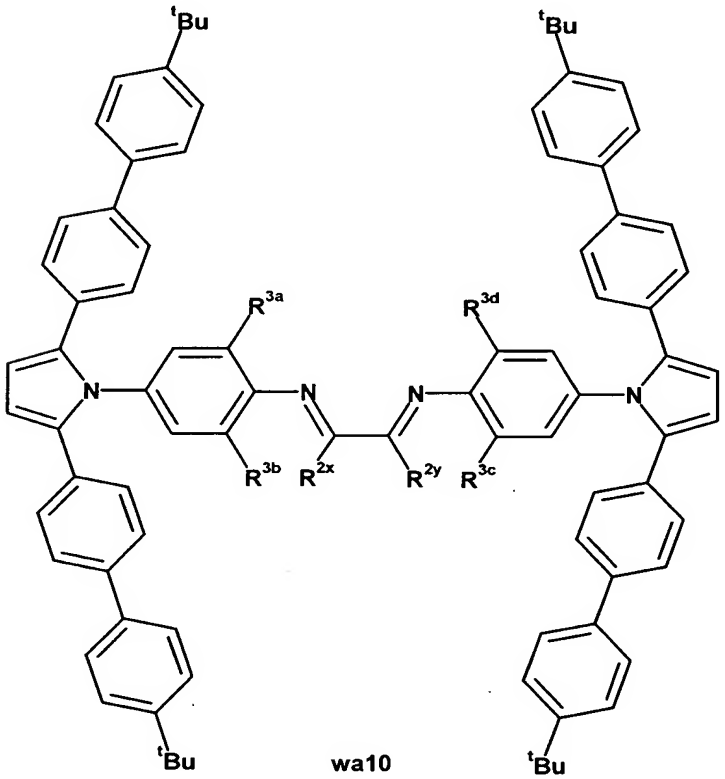


wa8

Set 1, cont'd

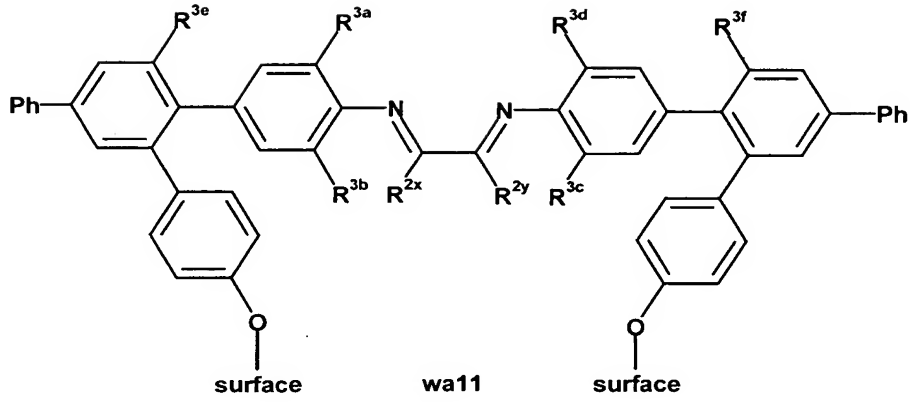


wa9

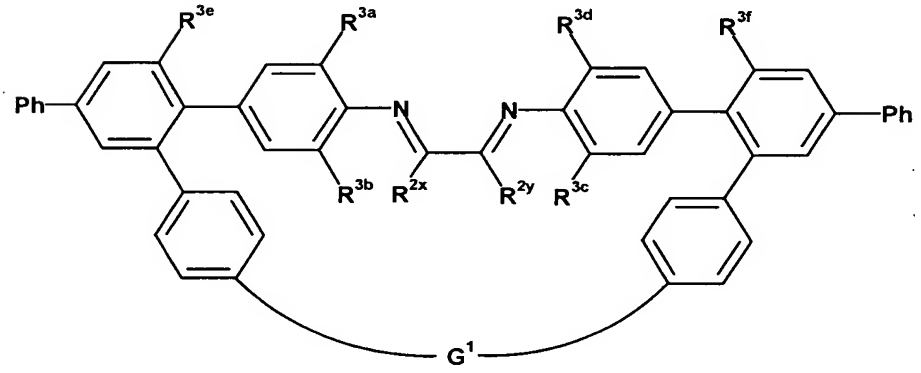


wa10

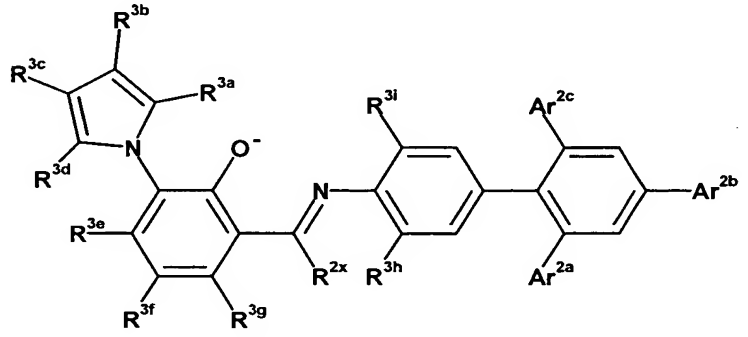
Set 1, cont'd



wa11

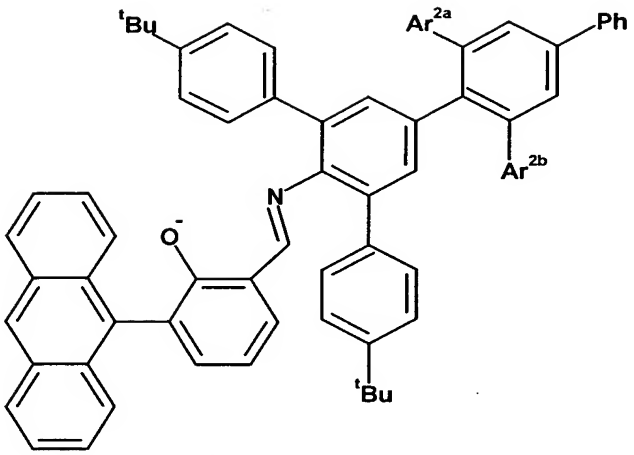


wa12

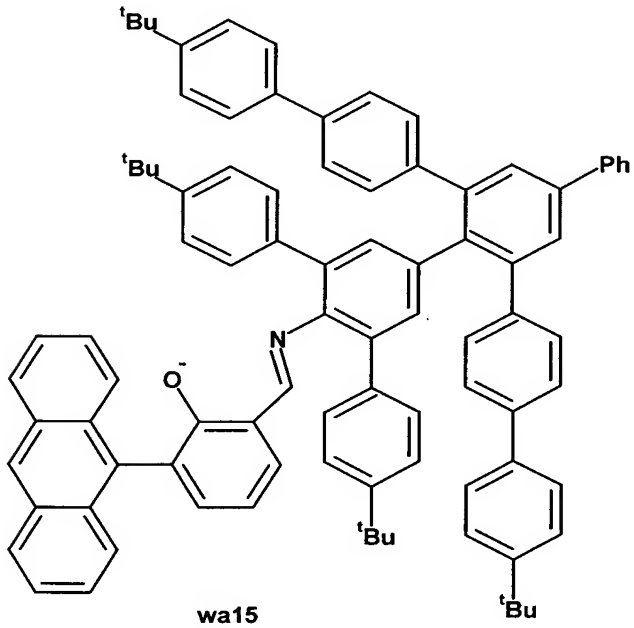


wa13

Set 1, cont'd

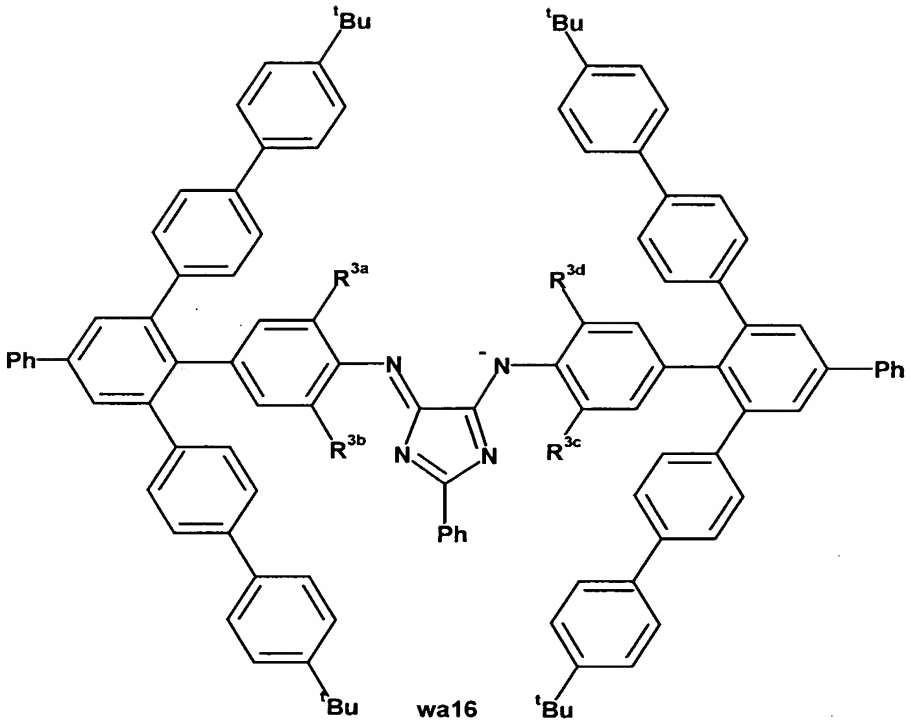


wa14

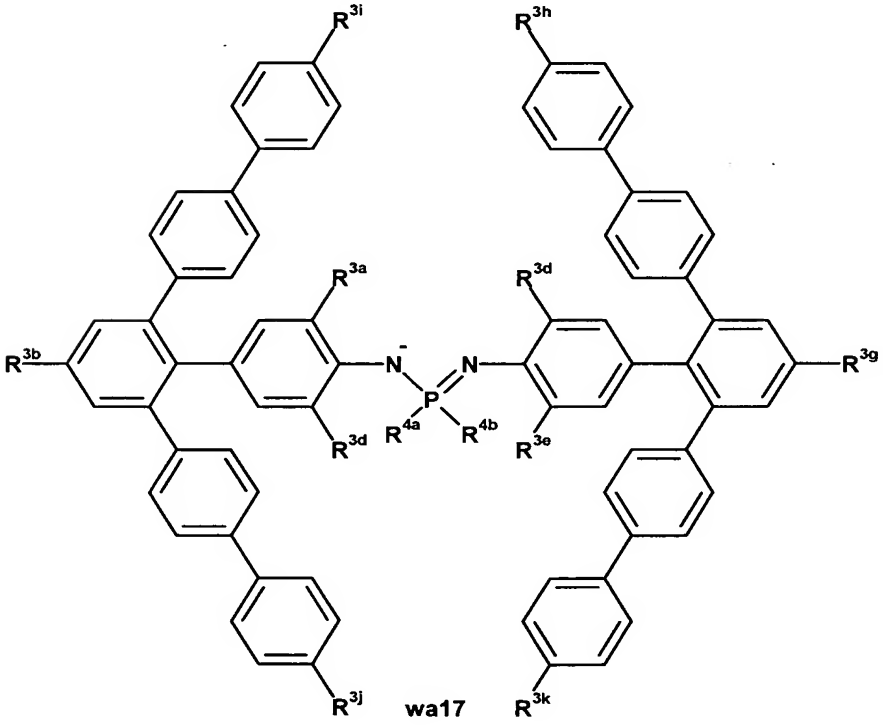


wa15

Set 1, cont'd

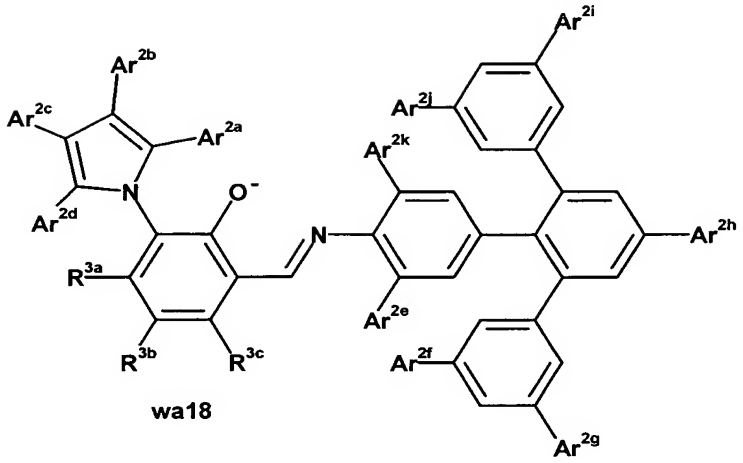


wa16

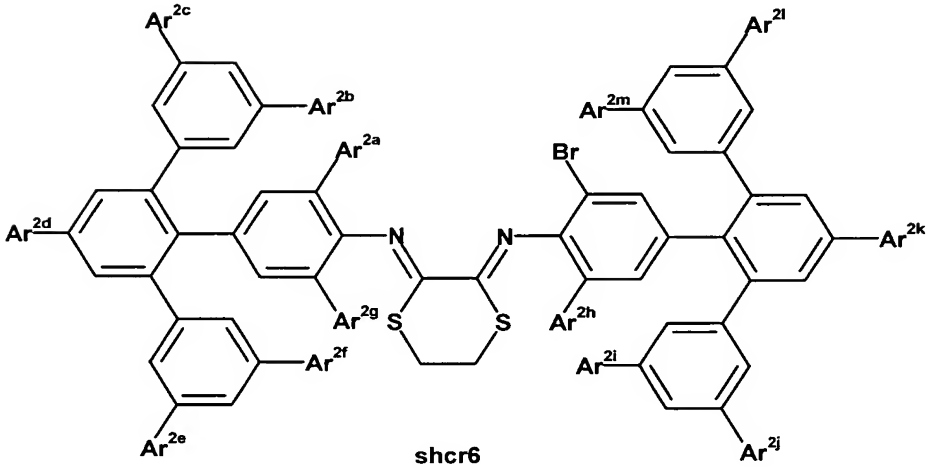


wa17

Set 1, cont'd



wa18



shcr6

wherein:

$R^{2x,y}$ are each independently H, hydrocarbyl, substituted hydrocarbyl, heteroatom connected hydrocarbyl, heteroatom connected substituted hydrocarbyl; silyl, or ferrocenyl; in addition, R^{2x} and R^{2y} may be linked by a bridging group;

R^{3a-k} are each independently H, hydrocarbyl, substituted hydrocarbyl, heteroatom connected hydrocarbyl, heteroatom connected substituted hydrocarbyl, fluoroalkyl, silyl, boryl, fluoro, chloro, bromo, cyano, or nitro;

$R^{4a,b}$ are each independently hydrocarbyl, substituted hydrocarbyl, heteroatom connected hydrocarbyl, heteroatom connected substituted hydrocarbyl; in addition, R^{4a} and R^{4b} may be linked by a bridging group;

"surface" refers to a silicon or other atom which is part of, or attached to, a solid support;

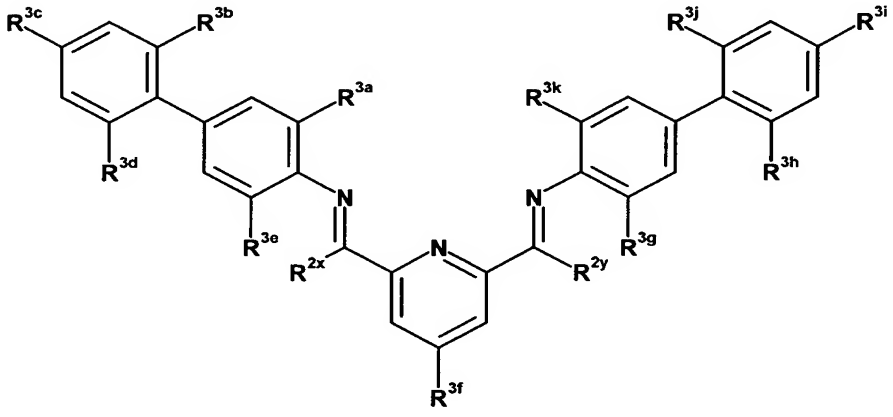
G^1 is a divalent bridging group; and

Ar^{2a-m} are each independently hydrocarbyl, substituted hydrocarbyl, heteroatom attached hydrocarbyl, heteroatom attached substituted hydrocarbyl, halo, nitro, boryl, or trialkoxysilane.

10. (original) The catalyst according to Claim 2, wherein M is iron or cobalt, the catalyst comprises a tridentate ligand, and Q^2 which is sufficiently long to extend sufficiently close to the metal M to increase the catalyst productivity at elevated temperatures.

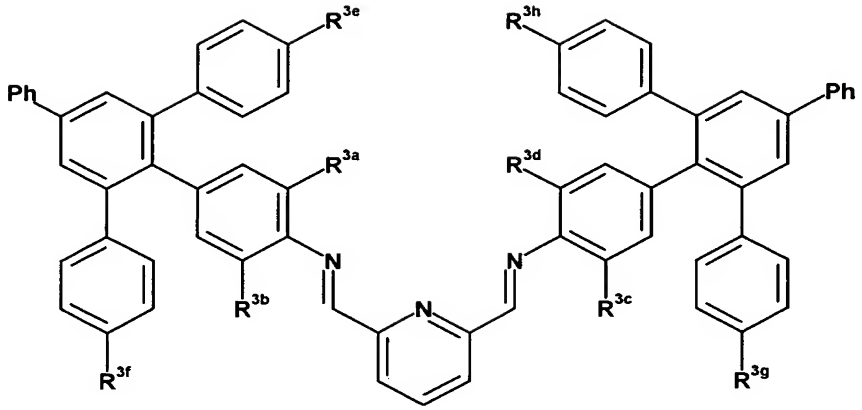
11. (original) The catalyst according to Claim 10, wherein said tridentate ligand is selected from **Set 2**;

Set 2



tri1

Set 2, cont'd



tri2

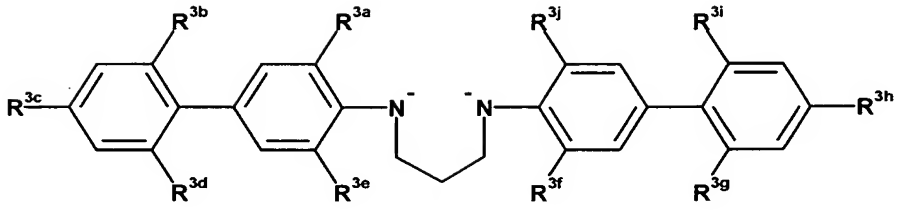
wherein:

$R^{2x,y}$ are each independently H, hydrocarbyl, substituted hydrocarbyl, heteroatom connected hydrocarbyl, heteroatom connected substituted hydrocarbyl; silyl, or ferrocenyl; and

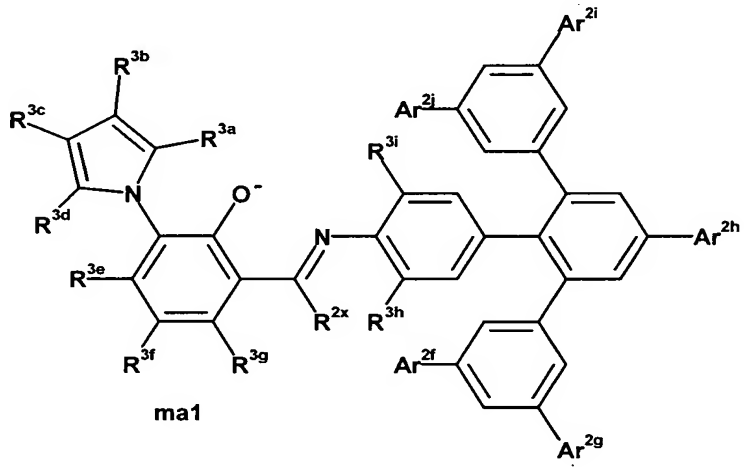
R^{3a-k} are each independently H, hydrocarbyl, substituted hydrocarbyl, heteroatom connected hydrocarbyl, heteroatom connected substituted hydrocarbyl, fluoroalkyl, silyl, boryl, fluoro, chloro, bromo, cyano, or nitro.

12. (original) The catalyst according to Claim 1, comprising a titanium or zirconium complex of a bidentate ligand selected from **Set 3**;

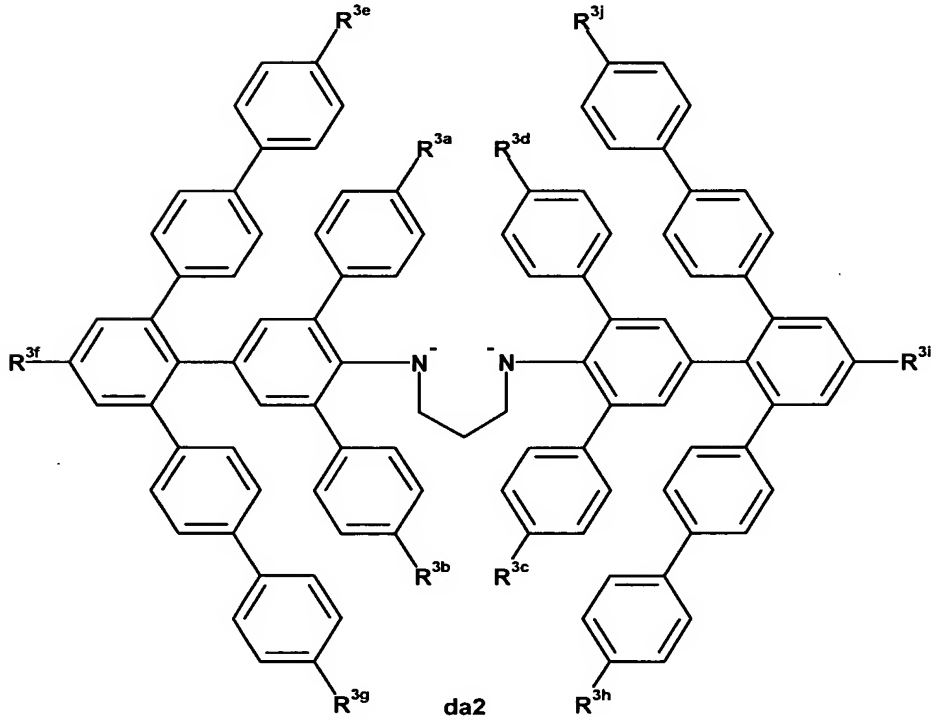
Set 3



da1



ma1



da2

wherein:

R^{2x} is H, hydrocarbyl, substituted hydrocarbyl, heteroatom connected hydrocarbyl, heteroatom connected substituted hydrocarbyl; silyl, or ferrocenyl;

R^{3a-j} are each independently H, hydrocarbyl, substituted hydrocarbyl, heteroatom connected hydrocarbyl, heteroatom connected substituted hydrocarbyl, fluoroalkyl, fluoro, chloro, or bromo; and

Ar^{2a-j} are each independently hydrocarbyl, substituted hydrocarbyl, heteroatom attached hydrocarbyl, heteroatom attached substituted hydrocarbyl, halo, nitro, boryl, or trialkoxysilane.

13. (original) The catalyst according to Claim 1, further comprising a solid support.

14. (original) The catalyst according to Claim 13, which is attached to the solid support via a covalent bond to the group Ar^{1a}.

15. (original) A process for the polymerization of olefins, comprising contacting one or more olefins with the catalyst of Claim 1.

16. (original) The process according to Claim 15, wherein at least one of said olefins is ethylene.

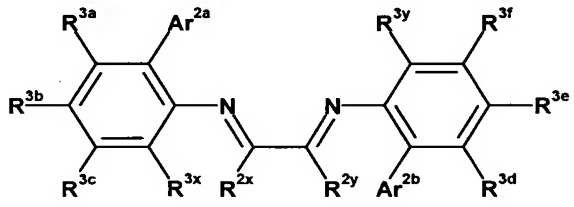
17. (original) The process according to Claim 15, wherein the olefin is ethylene, M is nickel, the temperature is at least 80 °C, the pressure is less than about 800 psig, sufficient hydrogen is added to reduce the number average molecular weight of the polymer by at least 20% relative to an otherwise similar reaction conducted in the absence of hydrogen, the catalyst productivity is at least 500 kg polyethylene per g nickel, and the polymer has a DSC first cycle peak melting point greater than 131 °C.

18. (original) The process according to Claim 17, wherein sufficient hydrogen is added to reduce the number average molecular weight of the polymer by at least 50% relative to an otherwise similar reaction conducted in the absence of hydrogen, and the polymer has a DSC first cycle peak melting point greater than 133 °C.

19. (original) The process according to Claim 15, wherein at least one of the olefins is ethylene, M is palladium and the amount of chain running is reduced.

Claims 20-34 (canceled)

35. (original) A catalyst for the polymerization of olefins, comprising a nickel complex of a ligand of formula **2a**;



2a

wherein:

$R^{2x,y}$ are each independently hydrocarbyl, substituted hydrocarbyl, heteroatom connected hydrocarbyl, heteroatom connected substituted hydrocarbyl, or silyl; in addition, R^{2x} and R^{2y} may be linked by a bridging group;

R^{3a-f} are each independently H, hydrocarbyl, substituted hydrocarbyl, heteroatom connected hydrocarbyl, heteroatom connected substituted hydrocarbyl, fluoroalkyl, silyl, boryl, fluoro, chloro, bromo, iodo, cyano, or nitro;

$R^{3x,y}$ are each independently halo or fluoroalkyl; and

$Ar^{2a,b}$ are each independently aryl or heteroaryl.

36. (original) The catalyst according to Claim 35, wherein R^{2x} and R^{2y} are linked by a bridging group.

37. (original) A process for the polymerization of olefins comprising contacting ethylene and optionally other olefins with the catalyst of Claim 35 in the presence of sufficient hydrogen to reduce the number average molecular weight of the polymer by at least 10% relative to an otherwise similar process carried out in the absence of hydrogen.

Claims 38-41 (canceled)